

Ninth Crime Mapping Conference

March 2007

Exploratory Spatial Analysis of Juvenile Delinquency and Recidivism

Phil Harris, Jeremy Mennis, Zoran Obradovic,
Alan Izenman, Heidi Grunwald, Yilian Qin,
Joseph Jupin, Brian Lockwood

Temple University

A Question

What happens when a criminologist, a geographer, a statistician, a computer scientist, and a higher education administrator get together to do interdisciplinary research on juvenile delinquency?

Observations...

1. Adolescent development and behavior can be supported and hampered by environmental forces.
2. Aftercare services must address youths' developmental needs, which may be aggravated by external forces that compete with program effects.

How Do Programs and Environment Interact



How Do Programs and Environment Interact



What types of programs work best for certain types of kids in certain types of neighborhoods?

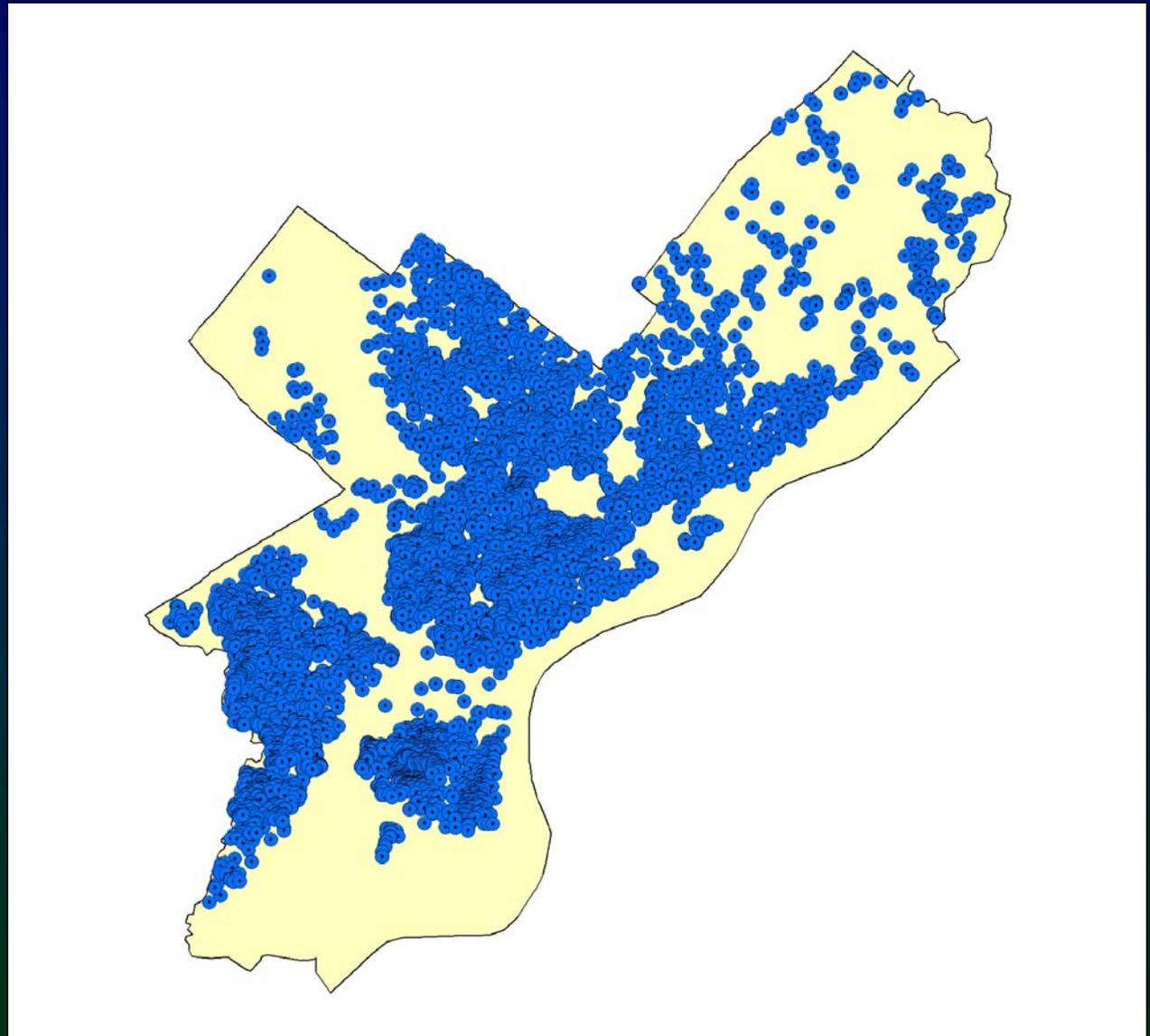
Research Objectives

To develop, apply, and evaluate improved techniques to investigate the simultaneous effects of individual, program, and neighborhood forces in preventing juvenile recidivism.

A case study focusing on adjudicated juvenile delinquents assigned to court-ordered programs by the Family Court of Philadelphia, Pennsylvania, during the years 1996 to 2003.

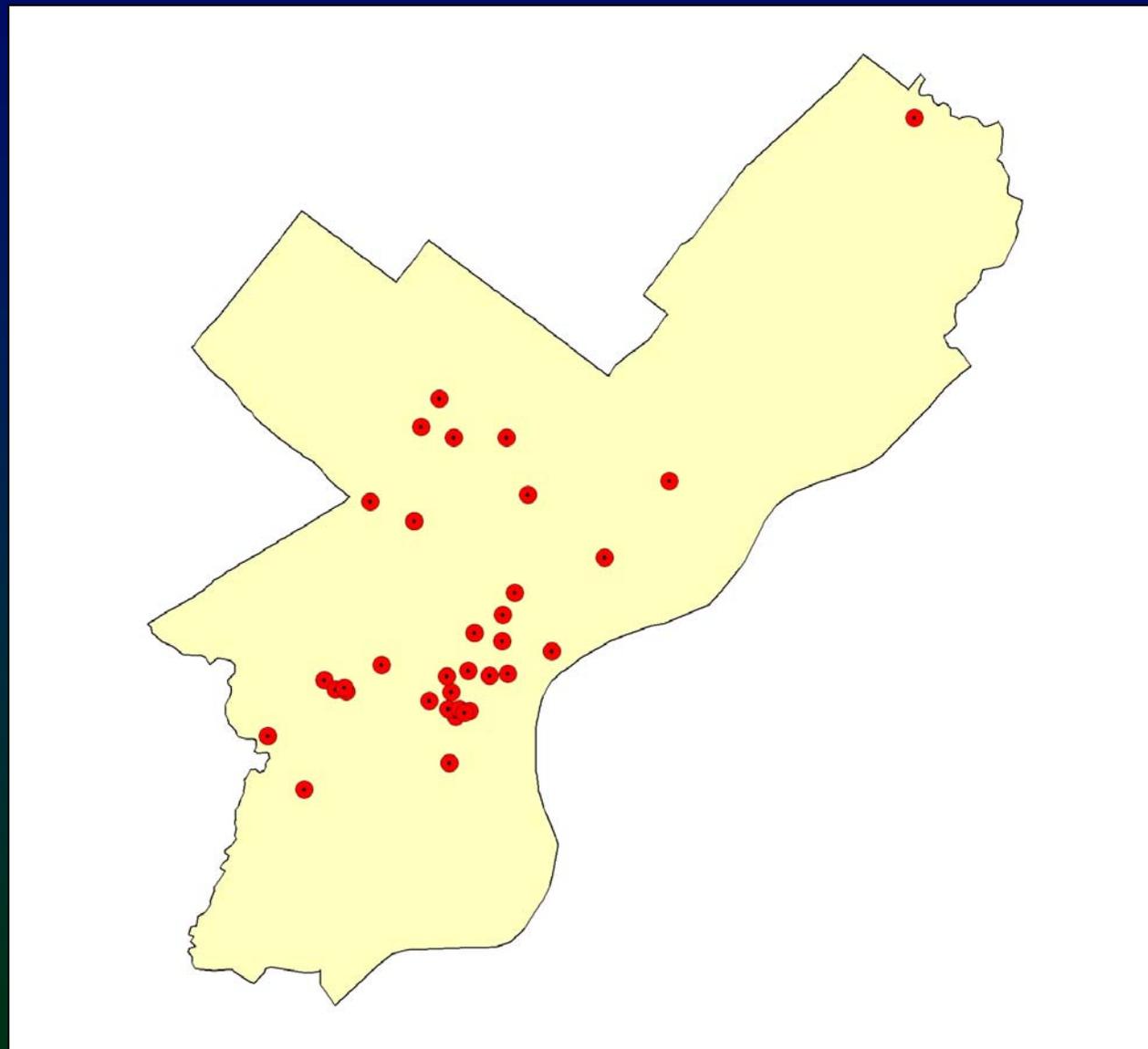
Program
Development
and Evaluation
System
(ProDES)

11,659 male
cases



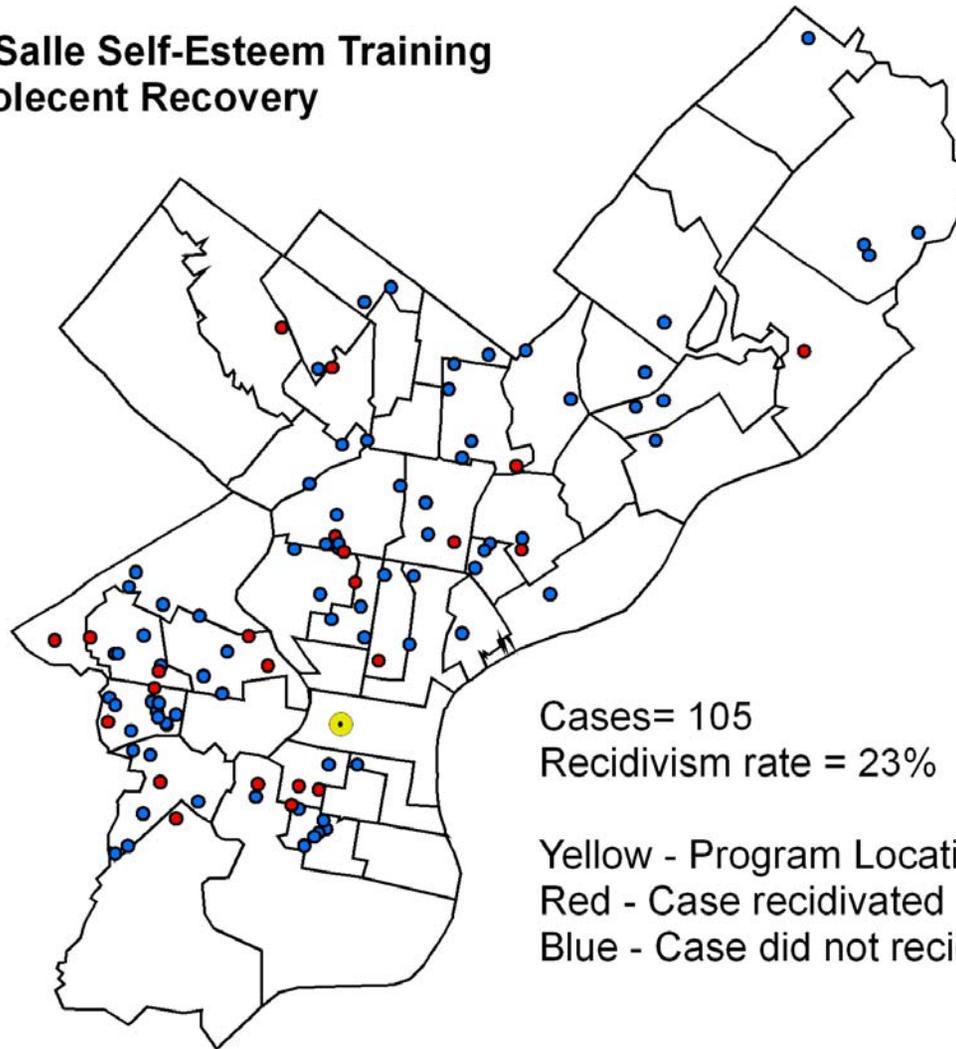
Program
Design
Inventory
(PDI)

43 programs
for boys



Recidivism by Program

De La Salle Self-Esteem Training for Adolescent Recovery

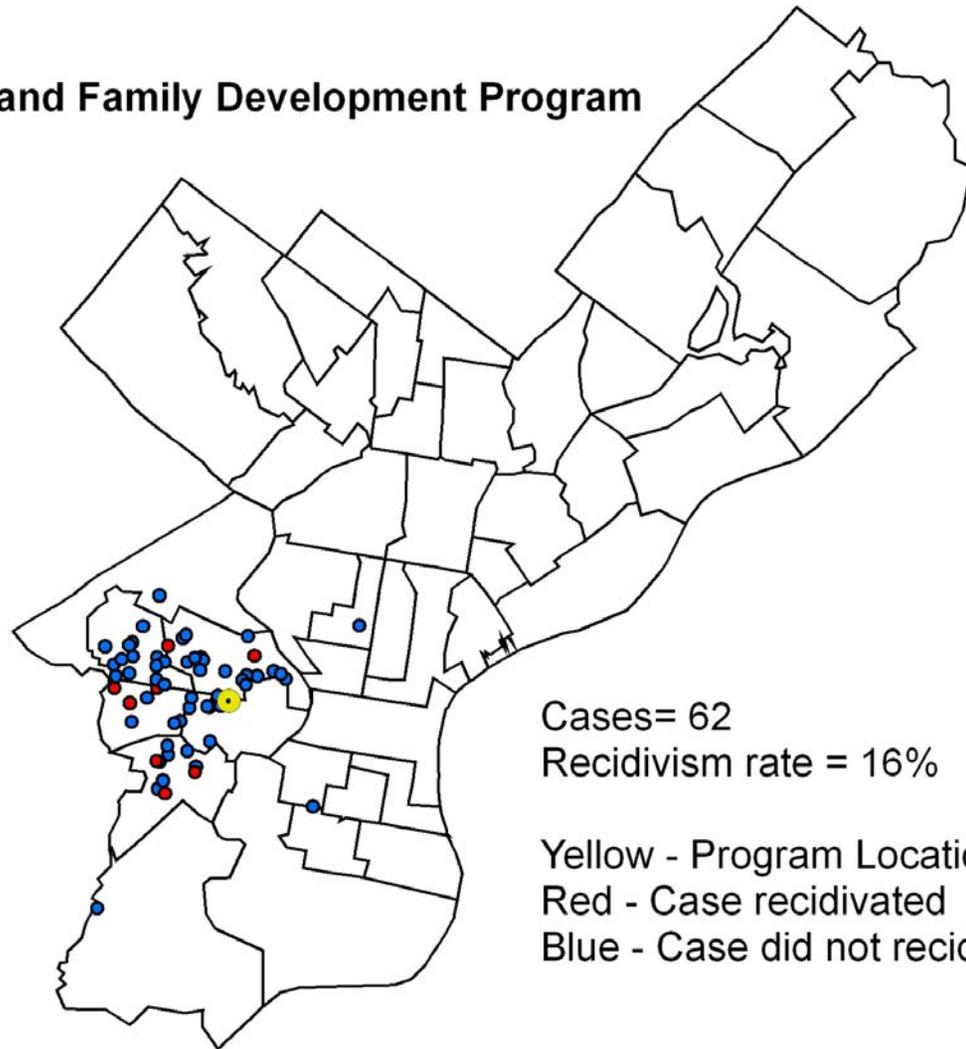


Cases= 105
Recidivism rate = 23%

Yellow - Program Location
Red - Case recidivated
Blue - Case did not recidivate

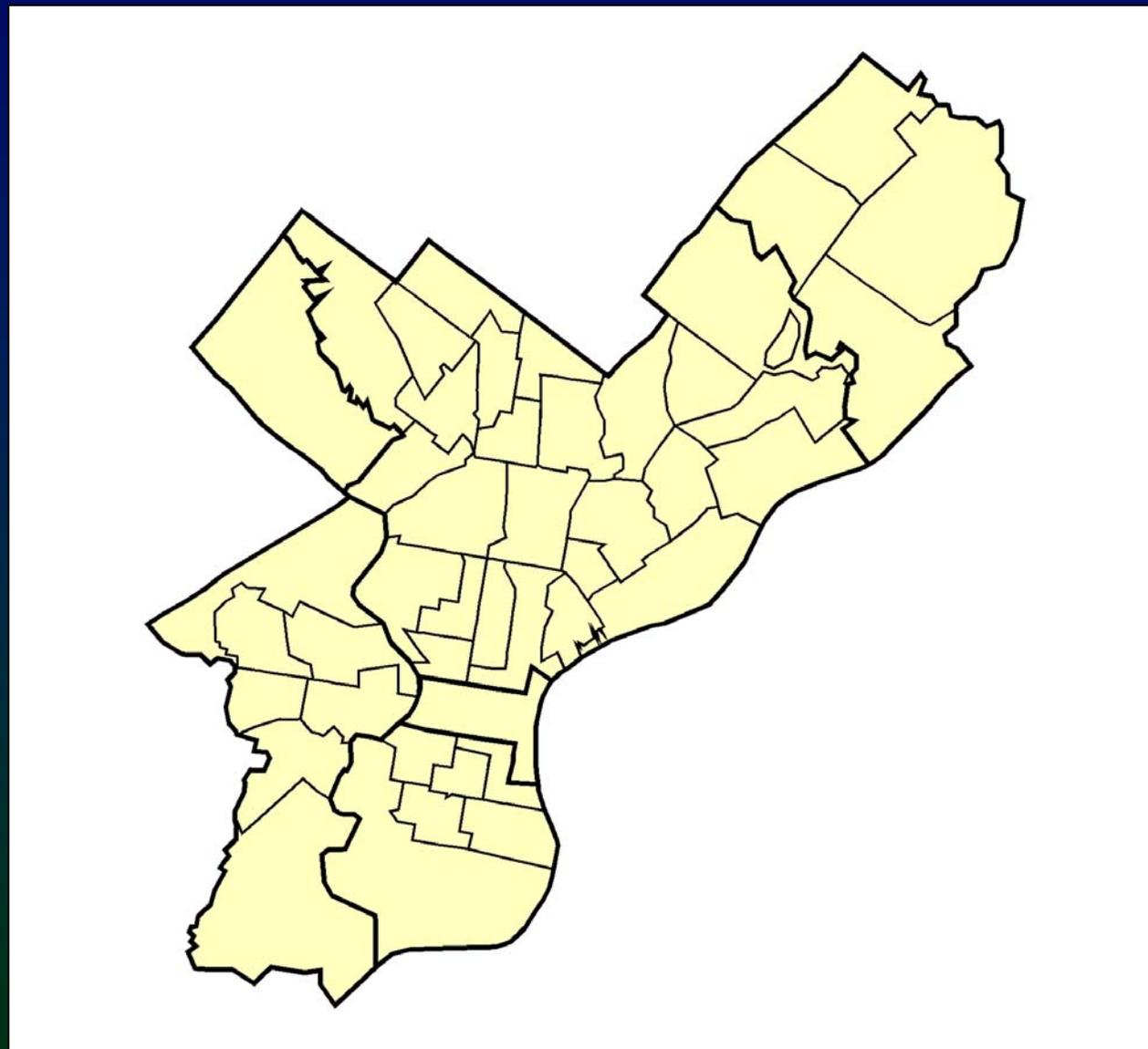
Recidivism by Program

Youth and Family Development Program



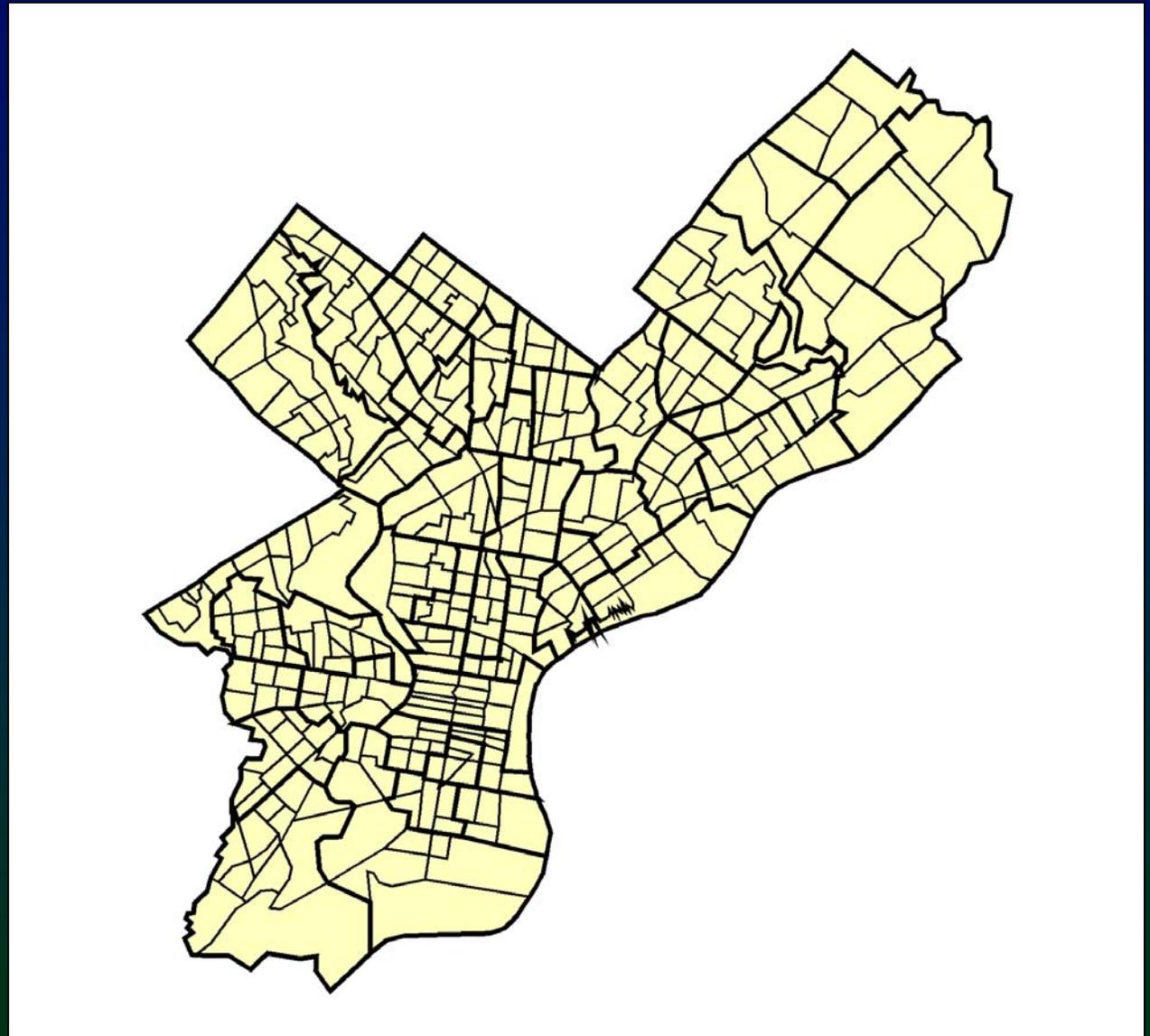
Philadelphia
Health
Management
Corporation
(PHMC)

45 neighbor-
hoods



U.S. Bureau
of the Census

365 tracts



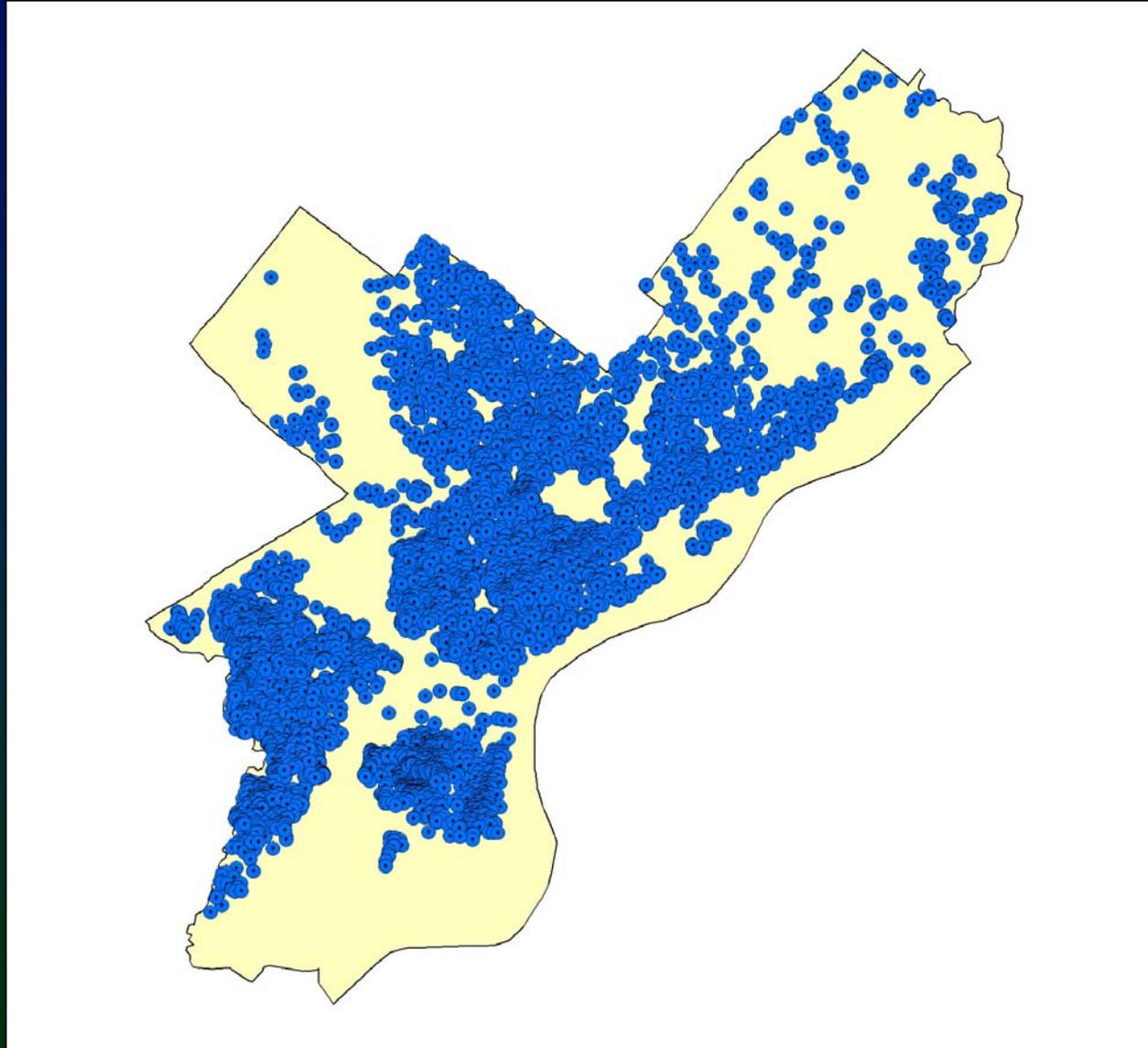
Challenges

- Data Integration
- High-Dimensional and Noisy Data
- Spatial Dependency and Heterogeneity

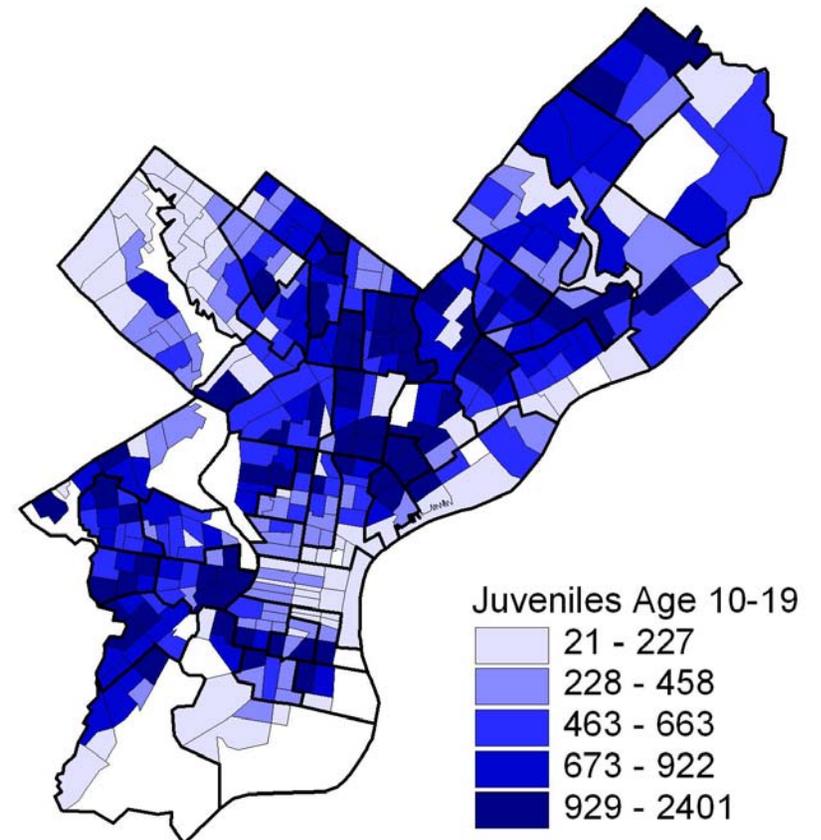
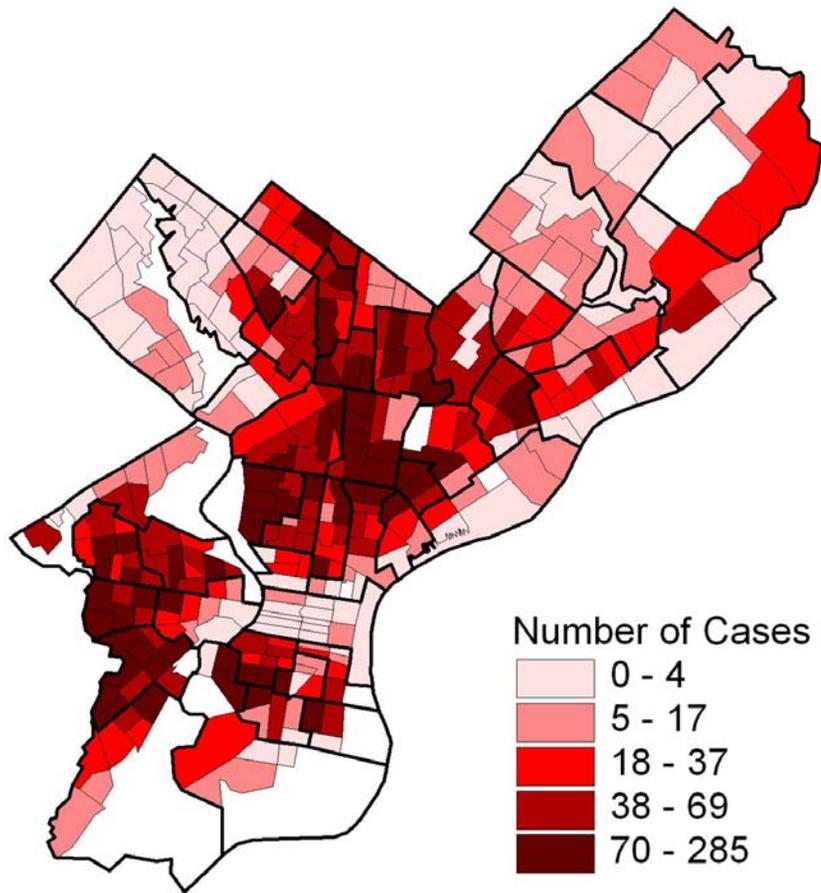
Research Design

- Data Preparation
- Data Exploration
- Model Construction, Evaluation, and Interpretation

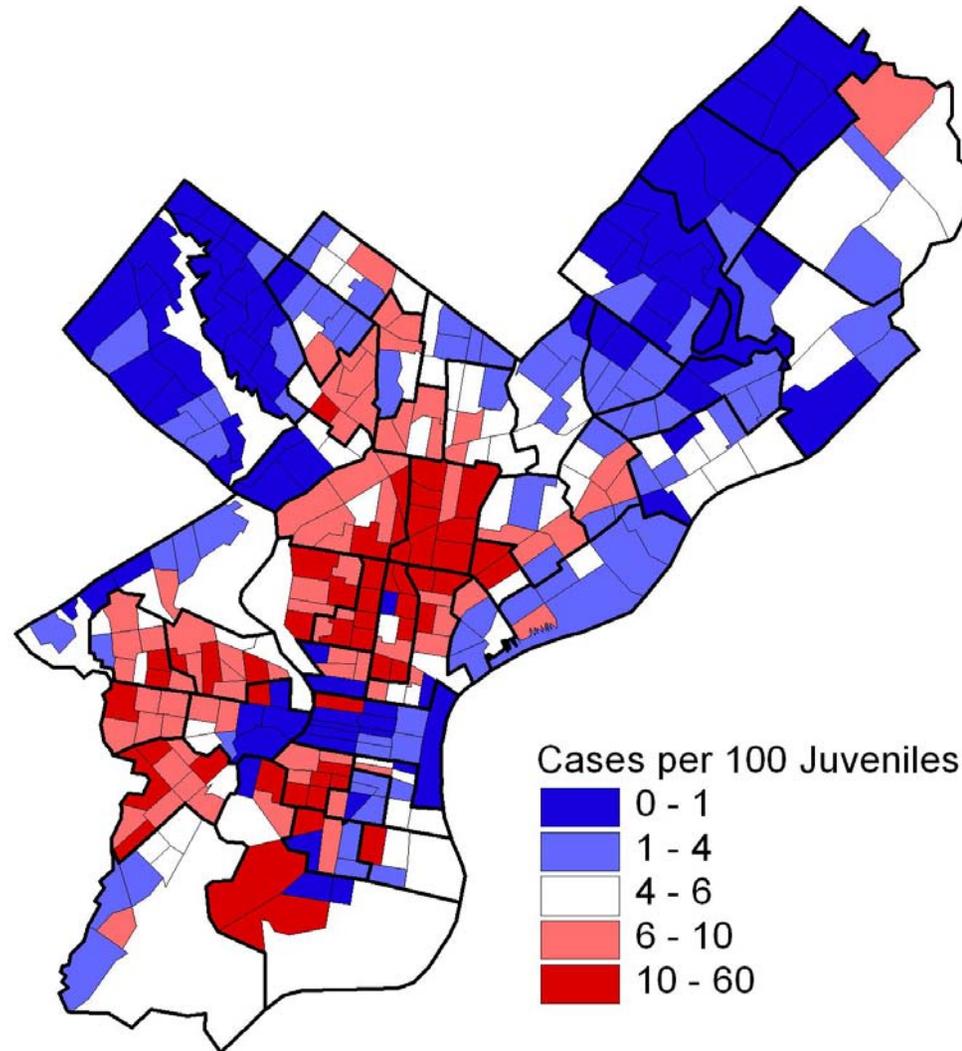
All Male Cases



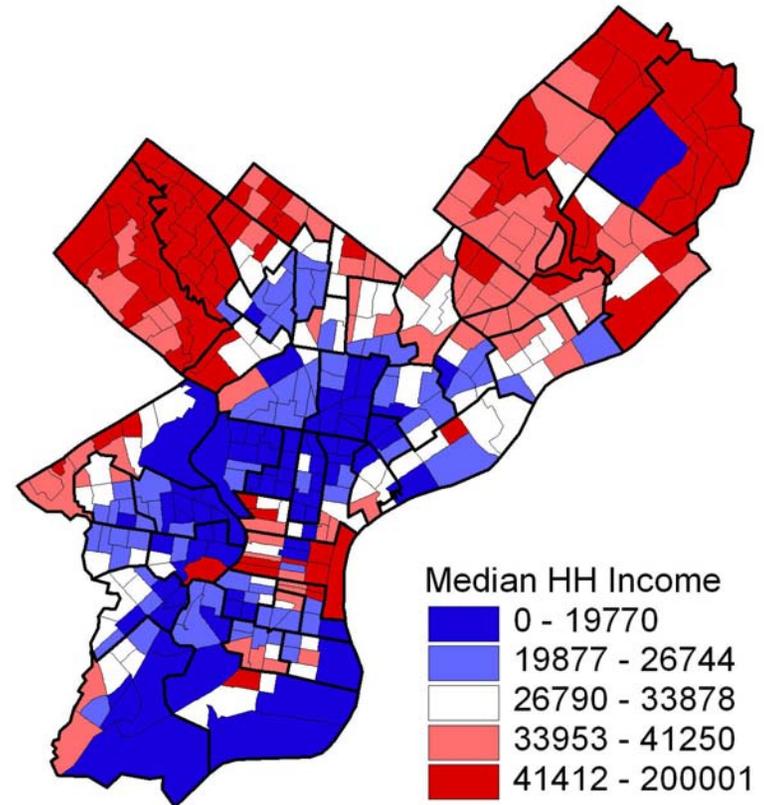
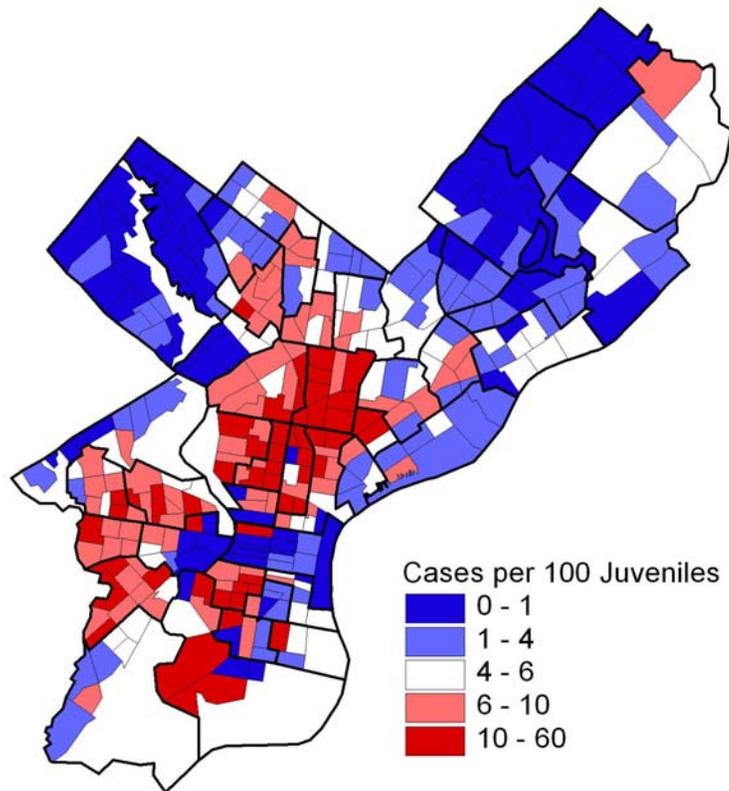
Cases and Juveniles by Tract



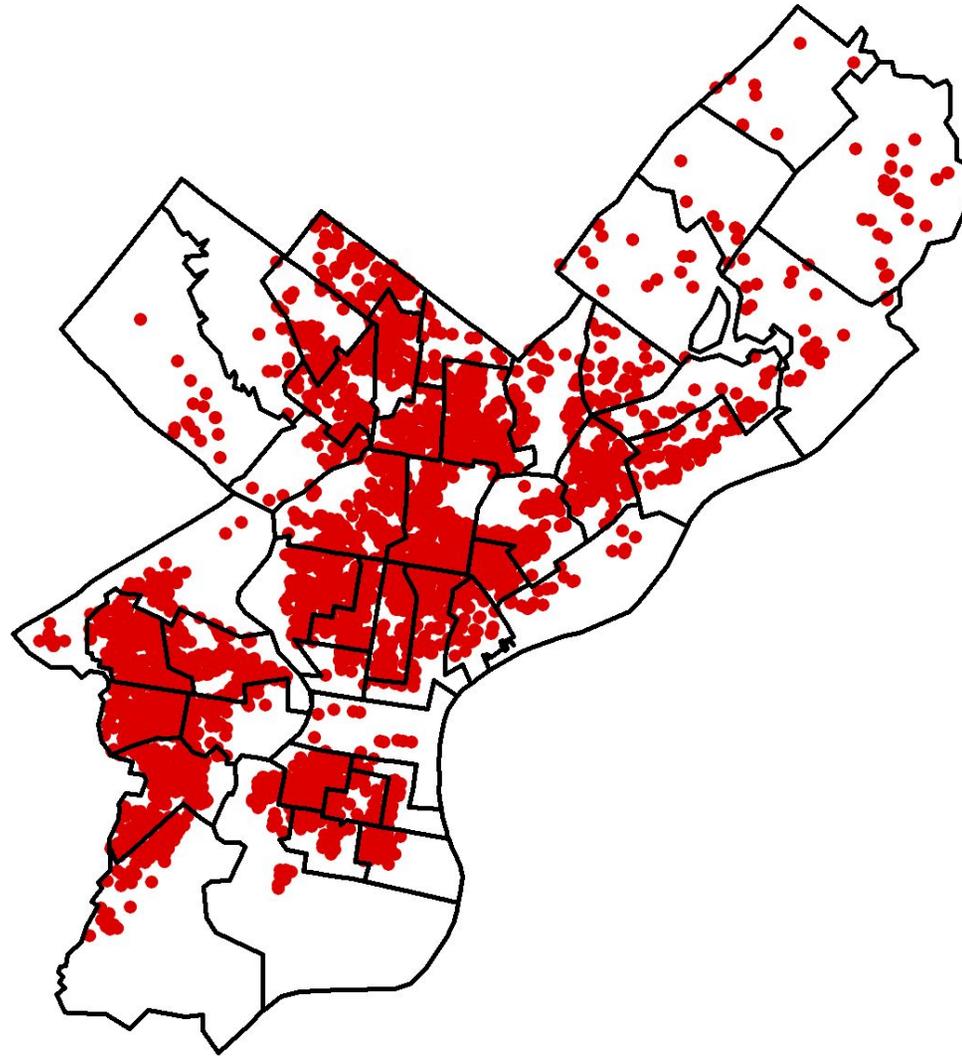
Number of Cases Per 100 Juveniles by Tract



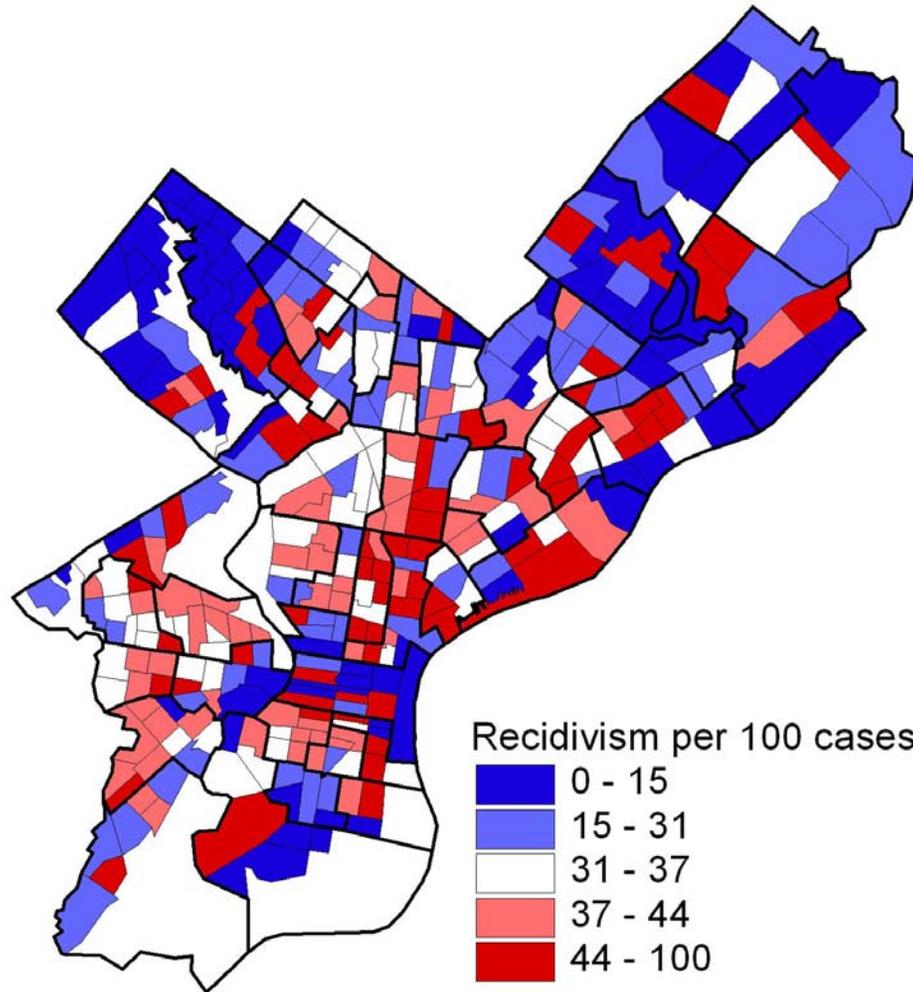
Number of Cases Per 100 Juveniles by Tract



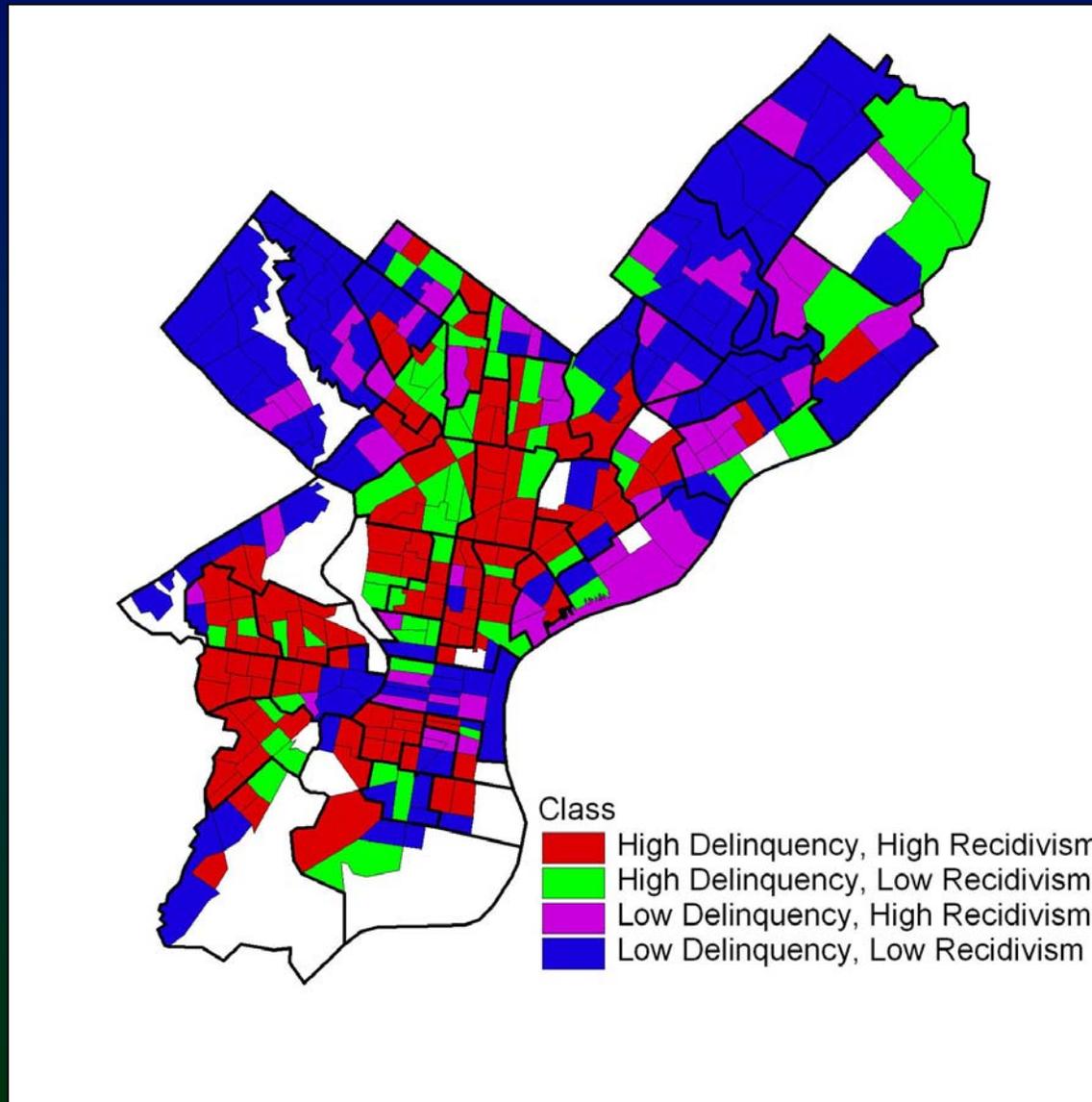
Recidivating Cases



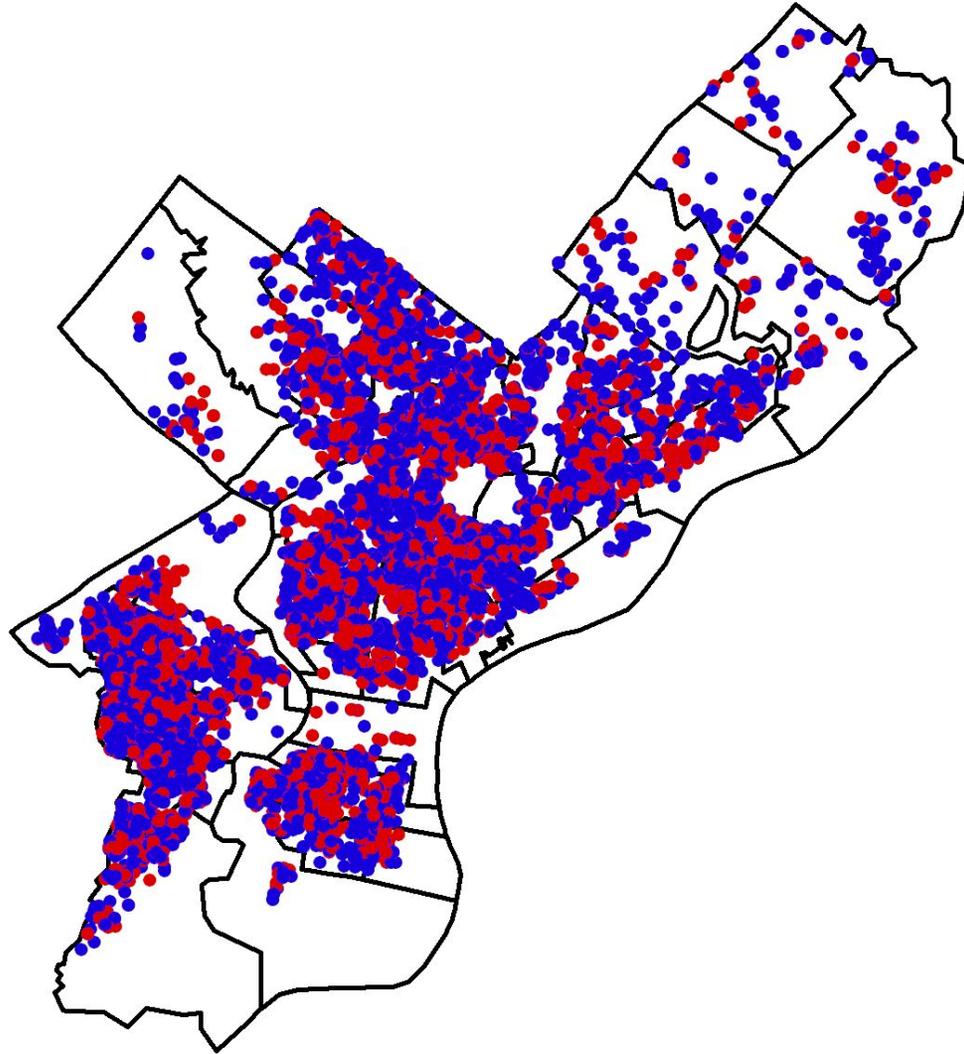
Recidivism Rate by Tract



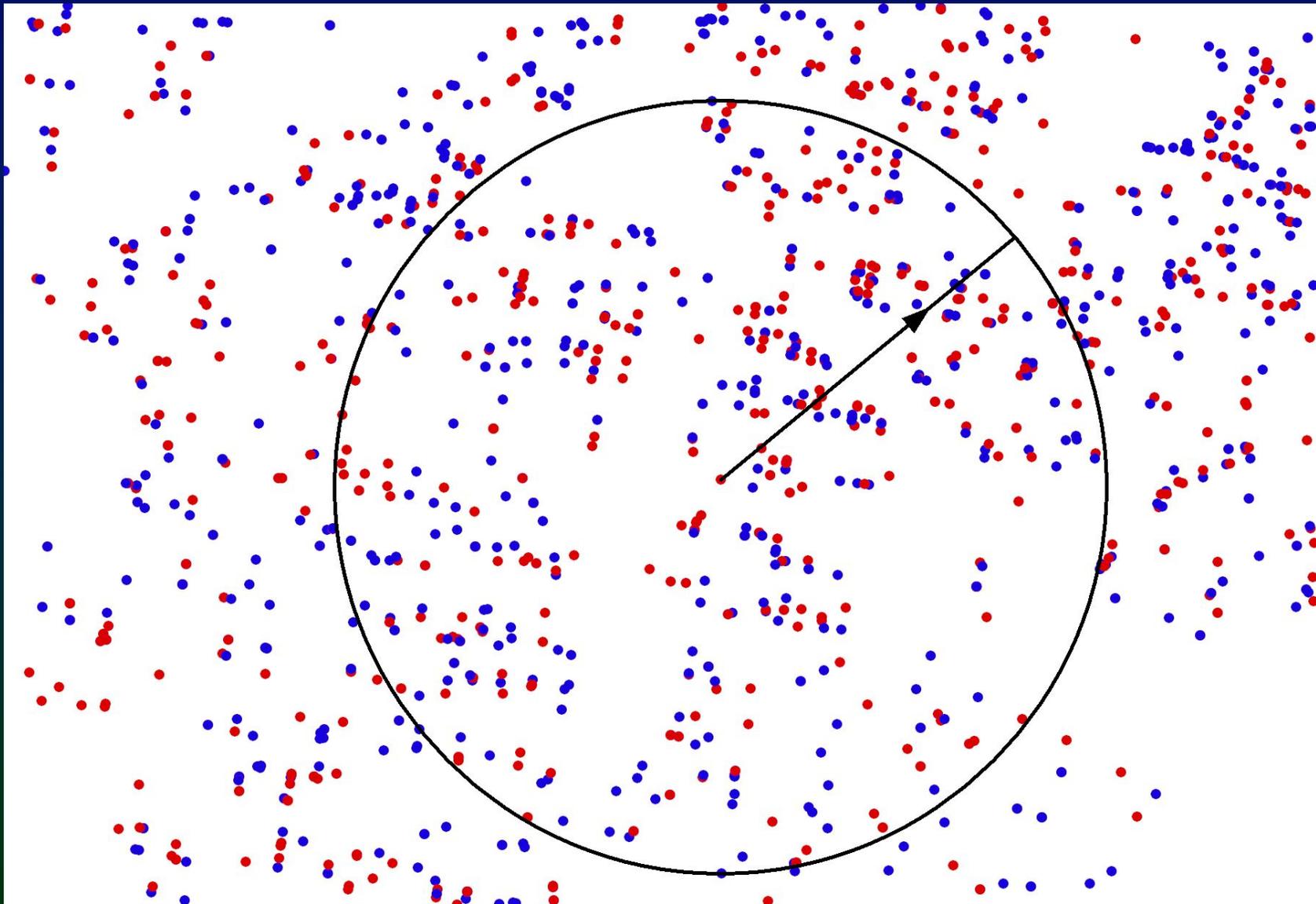
Combinations of Classed Delinquency and Recidivism



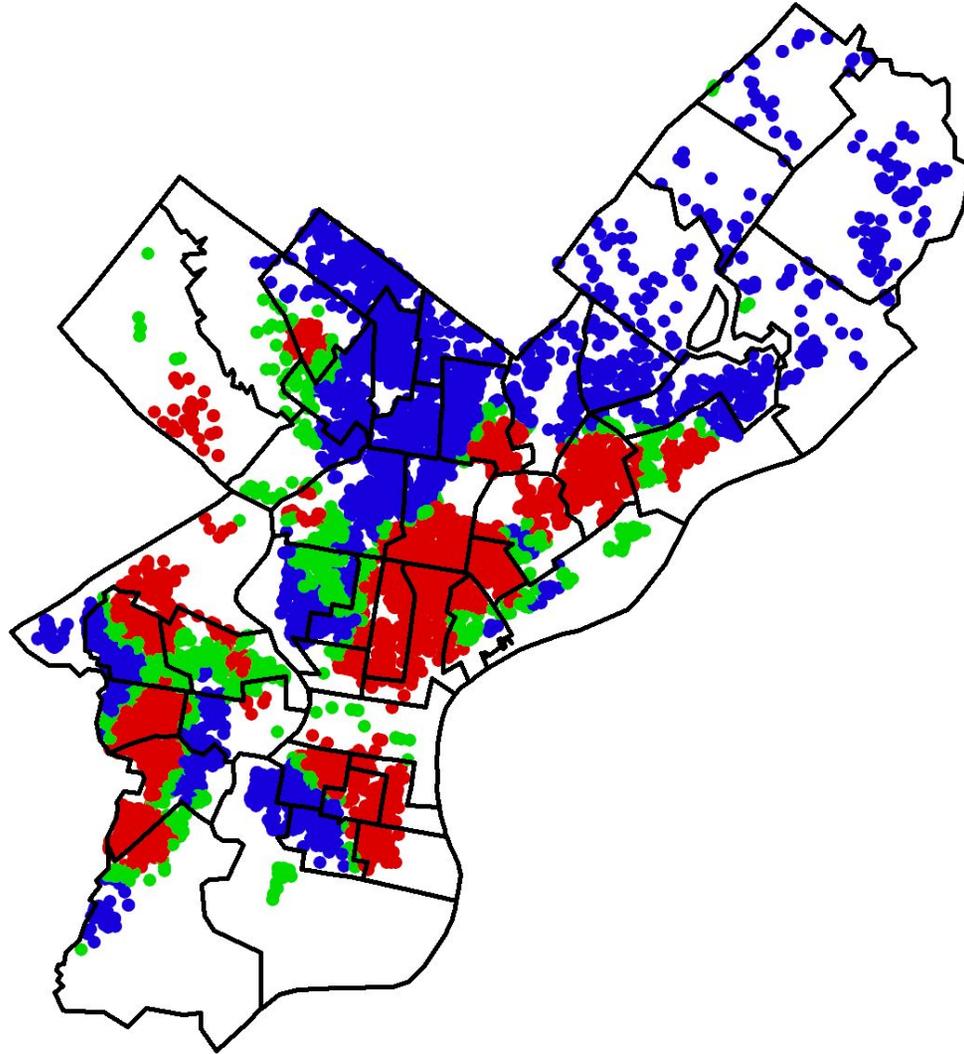
Cases: Recidivating and Non-Recidivating



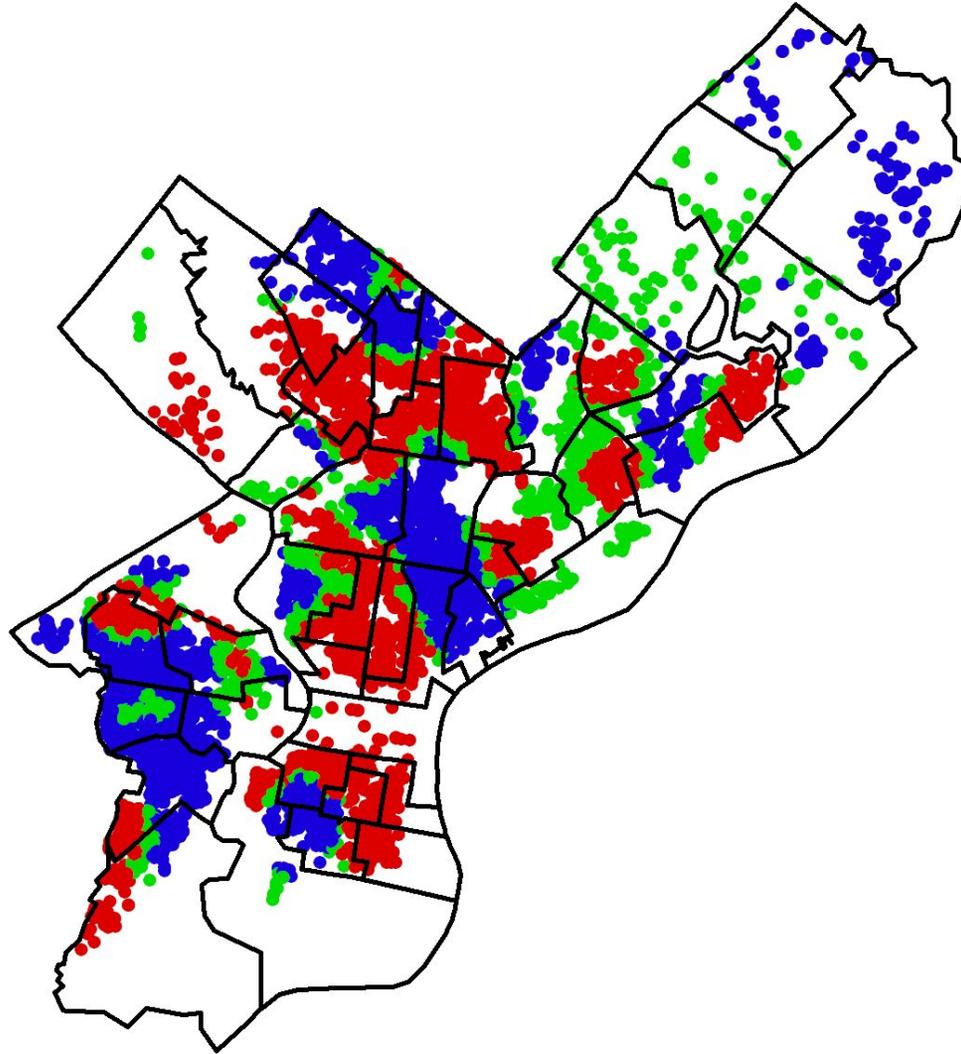
Cases: Recidivating and Non-Recidivating



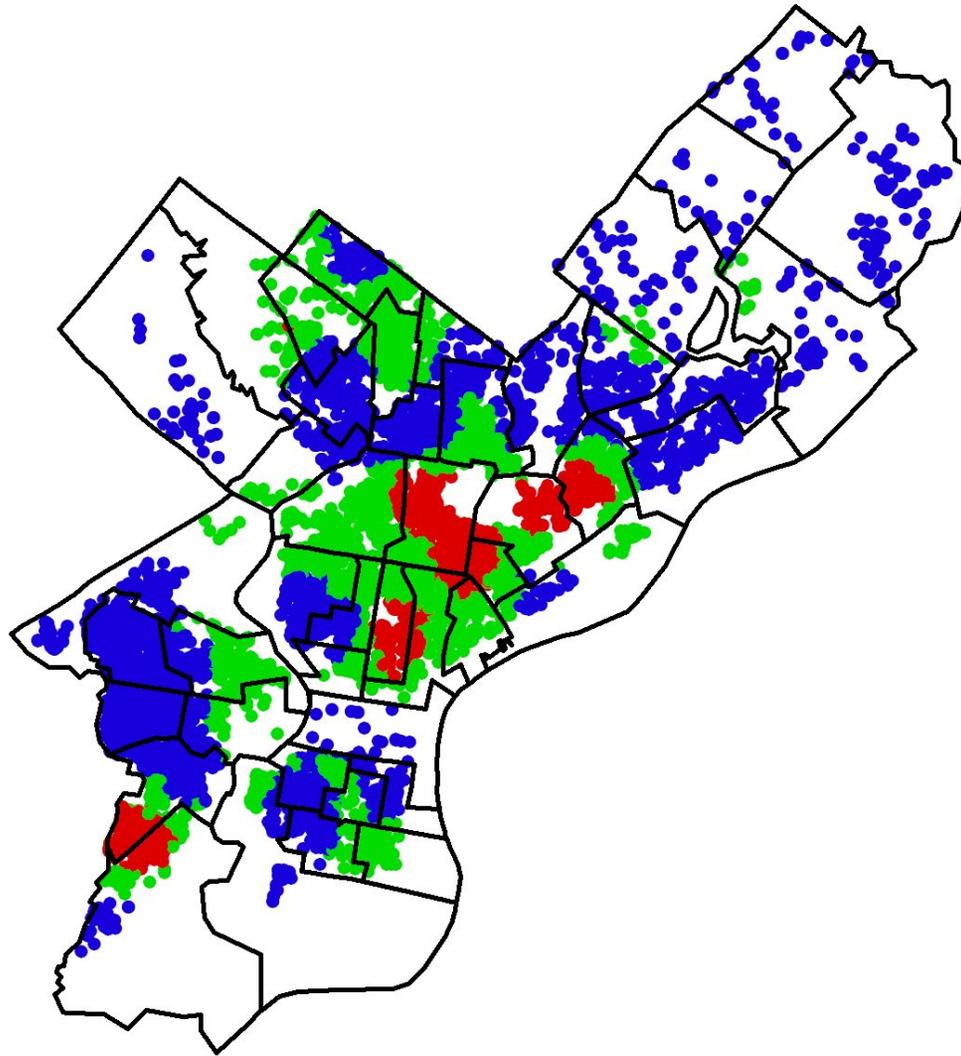
Clustering of Any Recidivism



Clustering of Person Offense Recidivism



Clustering of Recidivism with Removal from the Community



Onward!

- Completed data cleaning, dimensionality reduction.
- Investigate spatial non-stationarity in models of the target variables.
- Evaluate HLM and spatial econometric modeling for predicting target variables.

Acknowledgements

This research is supported by a grant from the National Institute of Justice.

Contact

Philip Harris

phil.harris@temple.edu

Jeremy Mennis

jmennis@temple.edu